

Learning Environment and Academic Engagement in Science of Junior High School Students

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Abstract

Junior high school is pivotal for developing skills and fostering a lasting interest in science subjects. Understanding the components that either lead to or hinder academic engagement is essential. This research investigates an indicator of the learning environment that significantly influences academic engagement in science of junior high school students. A quantitative descriptive correlational design was employed with 142 junior high school students selected through universal sampling, utilizing adapted instruments to assess the learning environment and academic engagement in science, and the gathered data was statistically analyzed using mean, standard deviation, Pearson r , and linear regression. This study revealed that the level of learning environment and academic engagement in science of junior high school students were both high. In addition, the study found a significant relationship between the learning environment and academic engagement in science among junior high school students. Moreover, the science learning environment indicators that significantly influence the academic engagement of junior high school students were the enjoyment of science lessons and investigation, highlighting the importance of cultivating a positive and enjoyable science learning experience, and the promotion of hands-on investigation in the educational process. Recommendations include fostering an improved overall student learning environment, schools continuing their commitment to quality education, teachers refining instructional delivery, and aligning science activities with student needs. This research is a valuable resource for future studies to contribute to enhancing knowledge in science education.

Keywords: learning environment; academic engagement; cognitive, behavioral, and emotional domain; junior high school students

1. Introduction

Over the years, science learning has increasingly shifted for a range of powerful reasons – the advancement of technologies, emphasis on skills in the K to 12 curricula, and the new standard school setup. These sudden changes will significantly affect many aspects of learning, including the motivation and engagement of students in the educational process. A concerning report on Philippine scientific literacy ranking second to last among 79 participating countries underscores challenges in the science educational system, despite teachers' efforts. The COVID-19 pandemic has further reshaped global education, affecting student engagement, as observed in Malaysia and various studies emphasizing the importance of effective science learning environments (Li et al., 2023; Law et al., 2022; Akomolafe & Adesua, 2015). In the Philippines, challenges faced by science teachers and the impact of student, family, and classroom factors on science learning are highlighted (Collates et al., 2022; Bernardo et al., 2023). Teachers, adapting to the new normal, play a pivotal role in creating conducive environments for academic engagement in science (Arietta et al., 2020; Adaro et al., 2022). The study's focus on how the learning environment influences academic engagement in

junior high school science students is significant for policymakers, school administrators, science educators, and students, offering insights and solutions. The research is anticipated to contribute valuable references for subsequent scientific and educational studies.

1.1. Statement of the Problem

The problem deals with the influence of learning environment on the academic engagement in science of junior high school students. The following questions will be the target to answer by this research:

1. What is the level of science learning environment with regards to student cohesiveness; teacher support; investigation; cooperation; open-endedness; material environment; and enjoyment of science lessons?
2. What is the level of academic engagement of junior high school in science subjects with regard to behavioral; emotional; and cognitive domains?
3. Is there a significant relationship between the learning environment and academic engagement in science of junior high school students?
4. Is there an indicator of the learning environment that significantly influences academic engagement in science of junior high school students?

1.2. Hypotheses

The following hypotheses were tested at a significance level of 0.05:

H₀₁. There is no significant relationship between the learning environment and academic engagement in science of junior high school students.

H₀₂. There is no indicator of the learning environment that significantly influences academic engagement in science of junior high school students.

1.3. Theoretical Framework

It is seen that there is a link between the learning environment and student engagement in science. This research is founded on the environmentalist learning theory by Albert Bandura. It relates to the understanding that a learning environment affects students' behavior and learning. Moreover, the learning environment is measured according to student cohesiveness, teacher support, investigation, cooperation, open-endedness, material environment, and enjoyment of science lessons, while academic engagement is measured through behavioral, cognitive, and emotional. Furthermore, both learning and behavior are regarded as environmental responses. This viewpoint empowers households, educational institutions, and teachers to recognize that students develop and learn new abilities in response to their environment (Lipoff, 2018). Additionally, Usman and Madudili (2019) believed that a learning environment with easily accessible amenities would ensure successful teaching and learning processes and student academic accomplishment.

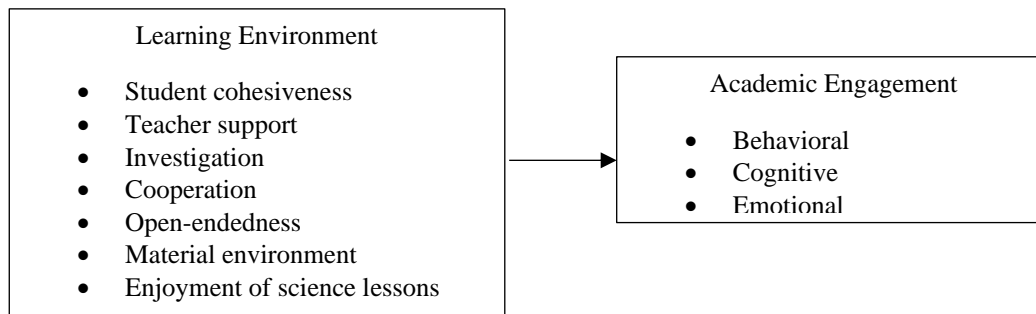


Figure 1. Conceptual framework showing the relationship between two variables.

2. Methodology

This research employed a non-experimental quantitative, descriptive correlational design to investigate the significant relationship between learning environment and academic engagement in science among junior high school students. The 142 research respondents selected through a universal sampling technique were officially enrolled in the 2022-2023 school year in one of the schools in Sta. Maria West District in the Division of Davao Occidental. The research instruments, adapted from Martin-Dunlop (2004) and Delfino (2019), underwent expert critique, pilot testing for reliability, and final refinement of the survey questionnaire based on feedback. The first instrument assessed the learning environment of junior high school students with 49 items, while the second instrument measured academic engagement with 30 items categorized employing a similar Likert scale, and both were interpreted through defined ranges of means. The researcher secured institutional permission, including an endorsement letter from the Holy Cross of Davao College's Dean of Graduate Studies, and obtained approval from the school's division superintendent and principal before administering the survey questionnaire to the respondents. Several statistical methods were employed including mean, standard deviation, Pearson Product-Moment Correlation Coefficient, and Regression Analysis. Lastly, this research followed complete ethical standards in the conduct of the study in adherence to the global protection of human rights.

3. Results and Discussions

The results of the research problems posted earlier in this study are presented here. This part includes the data presentation, analysis, and discussion based on the results obtained. The findings and discussion in this study are arranged under the following subsections: Level of Science Learning Environment, Level of Science Academic Engagement, Relationship Between Learning Environment and Academic Engagement in Science, and the Influence of Learning Environment Towards Academic Engagement in Science.

Level of Science Learning Environment

Table 1. Level of Science Learning Environment of Junior High School Students

Indicators	SD	Mean	Description
Student Cohesiveness	.54	4.21	Very High
Teacher Support	.54	4.05	High
Investigation	.54	4.18	High
Cooperation	.60	4.13	High
Open-endedness	.63	3.97	High
Material Environment	.79	3.92	High
Enjoyment of Science Lessons	.59	4.38	Very High
Total	.41	4.12	High

The overall level of the science learning environment is shown in Table 1, revealing a high level of the science learning environment ($\bar{x} = 4.12$, $SD = 0.41$). This indicates that students perceive the environment as a safe space for skill development, aligning with the importance of a conducive learning atmosphere. Enjoyment

of science lessons scored highest ($\bar{x} = 4.38$), emphasizing the impact of engaging lessons on attracting students to science, in line with OECD (2016) and Bulunuz (2015) findings. Other indicators, such as student cohesiveness ($\bar{x}=4.21$) and investigation ($\bar{x}=4.18$), also received positive scores, while the material environment had the lowest mean ($\bar{x}=3.92$), suggesting a need for improved physical components. These findings are supported by Ozerem & Akkoyunlu (2015) and Hussain and Rizvi (2018), underscore the crucial link between the learning environment and academic engagement, influencing students' capabilities and achievement. The study advocates for educators to enhance the science learning environment through thoughtful organization and improvements in physical settings and activities.

Level of Science Academic Engagement

Table 2. Level of Science Academic Engagement of Junior High School Students

Domains	SD	Mean	Description
Behavioral	.61	4.07	High
Cognitive	.54	4.15	High
Emotional	.58	4.11	High
Total	.50	4.11	High

The overall level of academic engagement is shown in Table 2, revealing a high level of academic engagement level in science ($\bar{x} = 4.11$, $SD = 0.50$). The results implied that the students have an overall high level of academic engagement so that they can connect their hearts and minds to in-class activities. Thus, student engagement in activities inside the classroom is central to students' attainment in the learning process (Delfino, 2019). The cognitive domain scored highest ($\bar{x} = 4.15$), indicating active engagement when students use strategies in the learning process, consistent with Sahar & Nyazi (2022) and Wallace-Spurgin (2019). Emotional engagement followed with a mean of 4.11, while the behavioral domain had the lowest mean (4.07), suggesting room for improvement in student behavior and interest in academic work. Student interaction with teachers and peers was found to predict increased engagement, aligning with Lei et al. (2018). The 21st-century classroom emphasizes a holistic approach to engagement, encompassing emotional, cognitive, and behavioral aspects (Karafil & Oguz, 2019). Teacher factors, as highlighted by Delfino (2019), significantly influence engagement, a finding supported by Ginting (2022) and Almarghani and Mijatovic (2017) who emphasize the role of motivation, active learning, and teacher influence on student engagement. These findings underscore the multifaceted nature of academic engagement and the need for targeted interventions.

Relationship Between Learning Environment and Academic Engagement in Science

Table 3. Pearson Correlation Table

	Level of Academic Engagement		Decision on H_0	Interpretation
Level of Science Learning Environment		P		
	.731*	0.001	Reject	Significant

* Significant at 0.001 level of significance (2-tailed)

The study tested the significance of the relationship between the learning environment and academic engagement in science among junior high school students, using a significance level (α) of 0.01. The obtained p-value of 0.001 was below the significance level, providing strong evidence to reject the null hypothesis and affirming a significant relationship between the two variables. The overall correlation coefficient ($r = 0.754$) indicated a strong positive correlation, suggesting that when students enjoy science lessons and investigations in a conducive learning environment, their academic engagement in science significantly increases. Moreover, student participation in the learning environment plays a key role in student academic engagement. This is in line with the theory that this study anchored where the learning environment affects students' behavior and learning (Lipoff, 2018).

Impact of the Learning Environment
Towards Academic Engagement in Science

Table 4. Multiple Regression Coefficients with Learning Environment Variables as Influencers of Academic Engagement

Variables	B	SE	β	t	P
(Constant)	.315	.301		1.048	.297
Student Cohesiveness	.058	.064	.062	.904	.368
Teacher Support	.056	.065	.060	.849	.397
Investigation	.226	.073	.243	3.083	.002
Cooperation	.131	.056	.156	2.319	.022
Open-endedness	.115	.060	.143	1.897	.060
Material Environment	.051	.040	.079	1.262	.209
Enjoyment of Science Lessons	.271	.060	.318	4.532	.000
R = .754 ^a ; $\Delta R^2 = .569$; F = 25.249; Sig. = 0.001					

The regression analysis results (shown in Table 4) indicate that only two indicators of the learning environment have p values less than significance values of 0.05. This implies that these indicators have a major influence on the academic engagement of junior high school students in science to wit: enjoyment of science lessons ($B = .271$, $p < .001$) and investigation ($B = .226$, $p = .002$). The linear combination of these predictors explains that the science learning environment can explain 57 percent of the variability in academic engagement ($R^2 = 0.569$, $F = 25.249$, $p = 0.001$). Further, the close difference between R^2 and adjusted R^2 (0.023) indicates a more solid model. Thus, the regression equation for this model is academic engagement = $.315 + .271$ *enjoyment of science lessons + $.226$ *investigation+ $.131$ *cooperation. Since the two indicators, enjoyment of science lessons and investigation, are highly significant, the standardized coefficient denotes that the enjoyment of science lessons has the most influence on the academic engagement of junior high school students: $\beta = 0.318$, $t = 4.532$, $p = .001$. Of these two significant indicators, the investigation has the least influence. Thus, emphasizing the profound significance of fostering a positive and enjoyable science learning experience and advocating for immersive, hands-on investigation emerges as pivotal in shaping an enriching and impactful educational process (Hsbollah & Hassan, 2022).

4. Conclusion

From this study, the level of the science learning environment of junior high school students concerning student cohesiveness, teacher support, investigation, cooperation, open-mindedness, material environment, and enjoyment of science lessons was observable. However, the material environment obtained the lowest score among the indicators. Thus, teachers and other stakeholders must carefully choose and invest in the equipment and experiments used in practical science activities to provide students with relevant experience. Moreover, the level of science academic engagement of junior high school students concerning behavioral, cognitive, and emotional domains was manifested. Of the three domains, the students need to work on their behavioral aspects. Student interaction with the teacher and other students predicted increased behavioral engagement. The learning environment, in terms of student cohesiveness, teacher support, investigation, cooperation, open-endedness, material environment, and enjoyment of science lessons, strongly correlated with the academic engagement in science of junior high school students. Therefore, a significant relationship exists between the learning environment and academic engagement. The learning environment, in terms of enjoyment of science lessons and investigation, significantly influences the academic engagement in science of junior high school students.

5. Recommendation

Based on the findings, recommendations include encouraging students to enhance their overall learning environment to improve academic engagement in science through participation in holistic activities like laboratory experiments and engaging lessons. The school is advised to uphold its commitment to quality education by providing ongoing training for teachers and staff, upgrading facilities such as laboratories, and implementing a program to address challenges in laboratory experiences. Teachers should focus on emphasizing the profound significance of fostering a positive and enjoyable science learning experience and advocating for immersive hands-on investigation. Additionally, future researchers are encouraged to utilize the study's results to improve science education practices and explore similar studies across different educational levels, subjects, and larger respondent groups.

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